CLAIMS

What is claimed is:

1. An exit window for an electron beam emitter through which electrons pass in an electron beam, the exit window comprising:

   an exit window foil having an interior and an exterior surface; and

   a corrosion resistant layer having high thermal conductivity formed over the exterior surface of the exit window foil for resisting corrosion and increasing thermal conductivity.

2. The exit window of Claim 1 in which the exit window foil and the corrosion resistant layer each have a thickness, the thickness of the corrosion resistant layer being about 4% to 8% the thickness of the exit window foil.

3. The exit window of Claim 1 in which the exit window foil comprises titanium about 6 to 12 microns thick.

4. The exit window of Claim 3 in which the corrosion resistant layer comprises gold.

5. The exit window of Claim 4 in which the corrosion resistant layer is about .1 to 1 microns thick.

6. The exit window of Claim 3 in which the corrosion resistant layer comprises diamond.

7. The exit window of Claim 6 in which the corrosion resistant layer is about .25 to 2 microns thick.

8. The exit window of Claim 1 in which the corrosion resistant layer is formed by vapor deposition.

9. The exit window of Claim 1 in which the corrosion resistant layer includes a material having a density above .1 lb./in.^{3} and thermal conductivity above 300 W/m·k.

10. An exit window for an electron beam emitter through which electrons pass in an electron beam, the exit window comprising:

an exit window foil having an interior and an exterior surface; and

a corrosion resistant layer having high thermal conductivity formed over the exterior surface of the exit window foil for resisting corrosion and increasing thermal conductivity, the exit window foil comprising titanium about 6 to 12 microns thick and the corrosion resistant layer comprising gold about .1 to 1 microns thick.

11. An exit window for an electron beam emitter through which electrons pass in an electron beam, the exit window comprising:

an exit window foil having an interior and an exterior surface; and

a corrosion resistant layer having high thermal conductivity formed over the exterior surface of the exit window foil for resisting corrosion and increasing thermal conductivity, the exit window foil comprising titanium about 6 to 12 microns thick and the corrosion resistant layer comprising diamond about .25 to 2 microns thick.

12. An electron beam emitter comprising:

a vacuum chamber;

an electron generator positioned within the vacuum chamber for generating electrons; and

an exit window on the vacuum chamber through which the electrons exit the vacuum chamber in an electron beam, the exit window comprising an exit window foil having an interior and an exterior surface, and a corrosion resistant layer having high thermal conductivity formed over the exterior surface of the exit window foil for resisting corrosion and increasing thermal conductivity.

13. The emitter of Claim 12 in which the exit window foil and the corrosion resistant layer each have a thickness, the thickness of the corrosion resistant layer being about 4% to 8% the thickness of the exit window foil.

14. The emitter of Claim 12 in which the exit window foil comprises titanium about 6 to 12 microns thick.

15. The emitter of Claim 14 in which the corrosion resistant layer comprises gold.

16. The emitter of Claim 15 in which the corrosion resistant layer is about .1 to 1 microns thick.

17. The emitter of Claim 14 in which the corrosion resistant layer comprises diamond.

18. The emitter of Claim 17 in which the corrosion resistant layer is about .25 to 2 microns thick.

19. The emitter of Claim 12 in which the corrosion resistant layer is formed by vapor deposition.

20. The emitter of Claim 1 in which the corrosion resistant layer includes a material having a density above .1 lb./in.^{3} and thermal conductivity above 300 W/m·k.

21. A method of forming an exit window for an electron beam emitter through which electrons pass in an electron beam comprising:

providing an exit window foil having an interior and an exterior surface; and

forming a corrosion resistant layer having high thermal conductivity over the exterior surface of the exit window foil for resisting corrosion and increasing thermal conductivity.

22. The method of Claim 21 in which the exit window foil and the corrosion resistant layer each have a thickness, the method further comprising forming the thickness of the corrosion resistant layer about 4% to 8% the thickness of the exit window foil.

23. The method of Claim 21 further comprising forming the exit window foil with titanium about 6 to 12 microns thick.

24. The method of Claim 23 further comprising forming the corrosion resistant layer with gold.

25. The method of Claim 24 further comprising forming the corrosion resistant layer about .1 to 1 microns thick.

26. The method of Claim 23 further comprising forming the corrosion resistant layer with diamond.

27. The method of Claim 26 further comprising forming the corrosion resistant layer about .25 to 2 microns thick.

28. The method of Claim 21 further comprising forming the corrosion resistant layer by vapor deposition.

29. The method of Claim 21 further comprising forming the corrosion resistant layer with a material having a density above .1 lb./in.^{3} and thermal conductivity above 300 W/m·k.

30. A method of forming an exit window for an electron beam emitter through which electrons pass in an electron beam comprising:

providing an exit window foil having an interior and an exterior surface; and

forming a corrosion resistant layer having high thermal conductivity over the exterior surface of the exit window foil for resisting corrosion and increasing conductivity, the exit window foil comprising titanium about 6 to 12 microns thick and the corrosion resistant layer comprising gold about .1 to 1 microns thick.

31. A method of forming an exit window for an electron beam emitter through which electrons pass in an electron beam comprising:

providing an exit window foil having an interior and an exterior surface; and

forming a corrosion resistant layer having high thermal conductivity over the exterior surface of the exit window foil for resisting corrosion and increasing

thermal conductivity, the exit window foil comprising titanium about 6 to 12 microns thick and the corrosion resistant layer comprising diamond about .25 to 2 microns thick.

32. A method of forming an electron beam emitter comprising:

providing a vacuum chamber;

positioning an electron generator within the vacuum chamber for generating electrons; and

mounting an exit window on the vacuum chamber through which the electrons exit the vacuum chamber in an electron beam, the exit window comprising an exit window foil having an interior and an exterior surface, and a corrosion resistant layer having high thermal conductivity formed over the exterior surface of the exit window for resisting corrosion and increasing thermal conductivity.

33. The method of Claim 21 in which the exit window foil and the corrosion resistant layer each have a thickness, the method further comprising forming the thickness of the corrosion resistant layer about 4% to 8% the thickness of the exit window foil.

34. The method of Claim 32 further comprising forming the exit window foil with titanium about 6 to 12 microns thick.

35. The method of Claim 34 further comprising forming the corrosion resistant layer with gold.

36. The method of Claim 35 further comprising forming the corrosion resistant layer about .1 micron to 1 microns thick.

37. The method of Claim 34 further comprising forming the corrosion resistant layer with diamond.

38. The method of Claim 37 further comprising forming the corrosion resistant layer about .25 to 2 microns thick.

39. The method of Claim 32 further comprising forming the corrosion resistant layer by vapor deposition.

40. The method of Claim 32 further comprising forming the corrosion resistant layer with a material having a density above .1 lb./in.^{3} and thermal conductivity above 300 W/m·k.